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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICANT: Chambard et al.

SERIAL NO.: 09/846,483

FILED:

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May 1, 2001

TITLED:

LUBRICATING OIL COMPOSITIONS

RECEIVAGE Examiner: E. McAvoy
TO 17 CArt Unit: 1764

Atty. Docket No. 2000M005

Assistant Commissioner for Patents Washington, DC 20231

BRIEF ON APPEAL

Sir:

This is an appeal from the decision of the Examiner to finally reject claims 1 through 8 and 10 through 17, all claims remaining in the above-identified patent application. This final rejection was presented in an Office Action mailed July 26, 2002. A Notice of Appeal was filed January 9, 2003.

This brief is being filed in triplicate. It is requested that the requisite fee set forth in 37 CFR Section 1.17(f) be charged to Deposit Account No. 05-1710.

REAL PARTY IN INTEREST

All rights to the above-identified application were assigned, via an unrecorded assignment, from the named inventors to Infineum International Limited, a company incorporated in England. Infineum International Limited is the real party in interest to the above-identified patent application.

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RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences relating to this application and no decision in any other appeal or interference impacts the decision in the present appeal.

STATUS OF CLAIMS

The application now contains claims 1 through 8 and 10 through 17, as set forth in the attached Appendix. Claims 1 through 8 and 10 through 17, all claims remaining in this application, stand rejected.

STATUS OF AMENDMENTS FILED SUBSEQUENT TO FINAL REJECTION

There were no amendments presented subsequent to final rejection. All amendments to the claims presented subsequent to the filing of this application have been entered and considered by the Examiner.

SUMMARY OF THE INVENTION

The present invention is directed to trunk piston marine engine lubricating oil compositions and methods of using such compositions. More specifically, the invention is directed to the discovery that, when trunk piston engine lubricating oil compositions having a compositional total base number (TBN) of 25 or more contain only aromatic carboxylate-based detergent(s) (e.g., a salicylate), such compositions can provide excellent piston deposit control, and maintain asphaltenes in suspension within the lubricating oil of the trunk piston engine during use, in the absence of dispersant.

In evaluating the present invention, one must keep in mind that there are many classes of lubricating oils that are distinguished by the environment in which they are meant to be employed. Lubricating oil compositions for cars and trucks must meet stringent requirements for performance and thus, conventionally contain a broad array of performance including additives. Simultaneously, such lubricating oil compositions must not contain, or must contain in reduced amounts, certain additives which can, in use, introduce components into the engine exhaust gasses that will poison the catalyst of, and/or cause blockages in, catalytic converters and other anti-pollution devices invariably present in car and truck engine exhaust systems.

Marine diesel engine oils are intended for use in large compression-ignited engines operated at relatively lower speeds. Marine diesel engines emissions are not as stringently regulated as are car and truck engines, and marine diesel engines are not conventionally fitted with the type of anti-pollution devices used in cars and trucks. Marine diesel engines are also often operated with low quality fuels not suitable for use in car and truck engines.

Within the category of marine diesel engines there are further sub-categories. In medium-speed, four stroke marine diesel engines, referred to as trunk piston engines, a single lubricating oil composition is used to lubricate both the cylinders and crankcase of the engine. These trunk piston engine oils, or TPEOs, remain in the crankcase over extended periods and conventionally contain detergents to provide the lubricant with a total base number (TBN) sufficient to allow for the continuous neutralization of acids generated as byproducts of combustion introduced into the crankcase in the form of exhaust gasses that blow by the engine cylinders, commonly referred to as "blow-by gasses". Conventional TPEOs further contain dispersants that maintain in suspension insoluble combustion products and asphaltenes that are introduced into the lubricant as contaminants by contact with low quality marine fuel oils such as "Bunker W", or residual fuel oil commonly used in a marine environment. The contamination of the TPEO with asphaltenes can cause heavy deposits to form on the engine pistons, sometimes referred to as "black paint". These deposits can reduce engine performance and eventually cause engine failure.

In slow speed, two-stroke marine diesel engines, commonly referred to as a cross-head engines, the engine cylinders are lubricated with one lubricant composition (a marine diesel cylinder lubricant or MDCL), and the engine crankcase, bearings, gears and valve-train, are lubricated with another lubricating oil composition commonly referred to as a "system oil". MDCLs are fed into the engine cylinders mixed with the fuel and are consumed in use. Like TPEOs, MDCLs must be capable of neutralizing acidic combustion byproducts and thus, conventionally contain overbased detergent. However, as MDCL are not continuously circulated within the engine crankcase, there is no need for dispersant to maintain oil insolubles in suspension in the oil. The system oil contains additives to retard oxidation and control high temperature deposits. However, system oils do not contact the fuel oil or products of combustion and are not required to neutralize large amounts of acidic combustion by-products or asphaltenes

and thus conventionally contain relatively small amounts of detergent, have a relatively low TBN (e.g., about 2 to about 8) and contain no dispersant.

As is clear from the foregoing, each of the above-classes of lubricating oil compositions are designed to perform different functions under different operating conditions, and each conventionally contains different types and amounts of additives. As noted above, and as is clearly set forth in claims 1 and 2 of the application (the independent claims), the present invention is expressly directed to TPEOs. One of ordinary skill in the art would characterize such lubricating oils as relatively high TBN, single grade lubricating oil compositions adapted to operate in a four-stroke marine engine fueled with low quality diesel fuels. Conventional compositions of this type would be expected to contain, as essential additives, detergent, dispersant and antiwear additive, and as optional other additives, pour point depressants, antifoamants and/or demulsifiers.

ISSUES

- (1) When it is accepted by those of ordinary skill in the art that (a) different classes of lubricating oil compositions exist, and conventionally differ in the type of additives contained therein, (b) conventional lubricating oil compositions of a first class (TPEO) invariably contain a specific first additive (dispersant), and (c) conventional lubricating oil compositions of a second class (MDCL) generally do not contain that first additive (dispersant), would one of ordinary skill in the art reading a disclosure directed specifically to said second class of lubricating oil compositions be provided with the motivation to formulate a lubricating oil composition of the first class that did not contain said first additive?
- (2) In a patent claiming a lubricating oil composition that conventionally contains a multitude of additives including a dispersant, where the selection of only certain of said additives other than the dispersant is germane to the claim invention, does the mere use of a descriptive term implying that the dispersant is optional, without more, provide one of ordinary skill in the art with the motivation to form a dispersant-free formulation?

GROUPING OF THE CLAIMS

The application now contains claims 1 through 8 and 10 through 17. Claims 1 through 8, and 11 through 16, claiming a lubricating oil composition, should be considered a first group of claims that stand or fall together. Claims 10 and 17 are directed to a method of lubricating a medium speed compression ignited marine engine and together constitute a second group of claims that will be separately argued.

ARGUMENT

As noted *supra*, the present invention is directed expressly to trunk piston marine engines lubricating oil compositions. More specifically, the invention is directed to the discovery that, when a trunk piston engine oil, or TPEO, having a TBN of 25 or more contains an aromatic carboxylate-based detergent(s) (e.g., a salicylate) as the sole overbased detergent(s) of the composition, the compositions can provide excellent piston deposit control, and maintain asphaltenes in suspension within the lubricating oil after use, in the absence of dispersant. The data of the specification, set forth beginning at page 12, compares the dispersant-free, overbased metal salicylate detergent-containing lubricating oil compositions of the present invention to conventional TPEO compositions containing a combination of dispersant and either metal phenate and metal sulfonate overbased detergents, or a combination of metal salicylate, metal phenate and metal sulfonate overbased detergents. The data clearly demonstrate that compared to the dispersant-containing formulations representing conventional TPEO compositions, the dispersant free compositions of the present invention actually provide improved piston deposit control. The effect demonstrated by these comparative tests has not been questioned or disputed.

Claims 1 through 8 and 10 through 17, all the claims remaining in the application, stand rejected under 35 USC Section 103(a) as being unpatentable over either of U.S. Patent No. 4,283,294 to Clarke (hereinafter referred to as "the Clarke patent") or U.S. Patent No. 6,114,288 to Fujitsu et al. (hereinafter referred to as "the Fujitsu et al. patent"). Appellants submit that both cited references are directed to non-analogous art and that the disclosures thereof would not have been considered relevant by one of ordinary skill in the art attempting to formulate a TPEO. Appellants further submit that, if considered, said references would fail to fairly suggest the TPEO compositions now claimed. Appellants therefore respectfully request that the Board reverse the Examiners decision to finally reject these claims.

THE CLARKE PATENT

The Clarke patent is expressly directed to lubricating oil compositions for crosshead marine diesel engines, which composition comprise at least two overbased detergents, each based on a different metal, and an antioxidant; there being a given ratio between the total weight of detergent and antioxidant. The Clarke patent is directed to non-analogous art, and as such is irrelevant to the subject matter now claimed. Further, if considered, the disclosure of the Clarke patent fails to fairly render obvious the presently claimed invention for a number of reasons.

As noted above, the invention is directed to the discovery that, by using only salicylate detergent(s) in, a lubricating oil composition having a TBN of 25 or more, piston cleanliness can be maintained in a trunk piston diesel engine, in the absence of dispersant.

The Clarke patent is expressly directed to MDCLs, which, as noted above, are for use in two-stroke engines in which lubricating oil and fuel oil are provided to the engine in a mixture consumed in use. Such lubricating oil compositions are not constantly circulated through the engine crankcase, are not intended to maintain insolubles in suspension over a prolonged operating period and thus, do not conventionally contain a dispersant. One of ordinary skill in the art, attempting to formulate a TPEO would not look to the disclosure of the Clarke patent. Further, if considered, there is nothing in the disclosure of the Clarke patent that would lead one of ordinary skill in the art to expect that the selection of a specified detergent would allow for the formulation of a TPEO, a crankcase lubricant for a four stroke engine, which contains no dispersant.

All the exemplified materials of the Clarke patent contain only phenate detergents. The Clarke patent in no way suggests that compositions containing only salicylate detergents will provide any improvement compared to corresponding formulations containing sulfonate and/or phenate detergents, or mixtures of sulfonate and/or phenate detergents and salicylate detergents. As the Clarke et al. patent does not suggest that the selection of detergent surfactant would have any effect on piston cleanliness performance, even assuming *arguendo* that one would motivated by the disclosure of the Clarke patent to attempt to formulate a dispersant-free TPEO, the disclosure of the Clarke patent fails to suggest that the use only of salicylate detergent(s) would allow one to do so.

For the reasons set forth above, Appellants submit that one of ordinary skill in the art would not consider the disclosure of the Clarke patent relevant to the formulation a TPEO, and that if considered, the disclosure of the Clarke patent would not suggest to one of ordinary skill in the art the specific TPEO formulations now claimed in claims 1 through 8 and 11 through 16. Claims 11 and 17, expressly require the addition of a dispersant-free lubricating oil composition into the crankcase of a four-stroke diesel engine, and are still further distinguishable over the disclosure of the Clarke patent. There is nothing in said disclosure that would lead one of ordinary skill in the art to expect that a dispersant-free formulation could even operate in such an environment, much less provide a performance improvement over conventional dispersant-containing formulations.

THE FUJITSU ET AL. PATENT

The Fujitsu et al. patent is directed primarily to the selection of certain ZDDP antiwear agents in combination with salicylate detergents in compositions having a relatively high shear viscosity. As noted in the description of the examples used to demonstrate the results of the claimed invention (beginning in Col. 8), the Fujitsu et al. patent is directed to the discovery that, in high shear viscosity oils, the selection of salicylate detergent and a specified species of ZDDP allows for adequate engine wear protection using a reduced amount of the phosphorus-containing wear resistance additive (the aforementioned ZDDP).

The Fujitsu et al. patent is not directed to lubricating oil compositions for use in marine diesel engines, which is clear from the reference (in the examples) to the API SG grade of the formulated oil (a passenger car motor oil standard) and the use of viscosity index improvers, which are indicative of a multigrade oil car or truck engine oil. Although not indicated, it is also clear that the compositions exemplified in the Fujitsu et al. patent have the relatively low TBN of a car or truck engine, which is below the presently required minimum of 25. In this regard, one can compare the compositions of the examples of the present specification, which contain about 16 to about 18 mass % of a mixture of 168 TBN and 280 TBN detergent and have a compositional TBN of 30, to Example 1 of the Fujitsu et al. patent, which contains only 5.2 mass % of a 150 TBN detergent.

Further, and more importantly, the basic premise of the Fujitsu et al. patent, as discussed above, is that salicylate detergents provide some antiwear benefit and that the use thereof allows

one to provide adequate wear protection in the presence of reduced amounts of ZDDP. The disadvantage of ZDDP is that it introduces phosphorus into the lubricant. Phosphorus in a lubricant can cause the poisoning of the catalyst used in antipollution devices provided on cars and trucks. Marine diesel engines are not conventionally provided with such antipollution devices.

Therefore, as with the Clarke et al. patent, it would be clear to one of ordinary skill in the art that the Fujitsu patent relates to a non-analogous class of lubricants, and the teachings thereof would not be considered relevant to TPEOs, particularly since the sole described benefit of the invention claimed in the Fujitsu pet al. patent is wholly irrelevant to lubricating oil compositions used in the operation of a trunk piston engine.

Further, Appellants submit that, if considered, the disclosure of the Fujitsu et al. patent would fail to fairly teach or suggest the lubricating oils now claimed, for the reasons set forth below:

COMPOSITIONAL TBN OF AT LEAST 25

:

The present claims require that the lubricating oil compositions of the invention have a compositional TBN of at least 25. Compositions having lower TBNs do not provide sufficient acid neutralization and thus, are not suitable for use in trunk piston engines. As noted above, the exemplified materials of the Fujitsu et al. patent have far lower compositional TBNs, and as the Fujitsu et al. patent makes no further mention of compositional TBN, it is clear that the reference fails to suggest this aspect of the claimed invention.

DISPERSANT-FREE COMPOSITION

The presently claimed lubricating oil compositions are substantially free from dispersant. The Fujitsu et al. patent fails to fairly suggest dispersant-free lubricating oil compositions. It is alleged that the disclosure of the Fujitsu et al. patent, at column 4, line 51, provides for dispersant-free compositions. Specifically, in describing the dispersant (the selection of which is not germane to the invention claimed in the Fujitsu et al. patent), it is noted that;

"[t]he lubricating oil compositions for internal combustion engines of the present invention *may* additionally contain an ash-free dispersant which is preferably admixed at from 5 to 10 mass %" (emphasis added).

Appellants submit that components, the selection of which is not particularly relevant to the improved effect provided by a claimed composition, are commonly described in patents in a manner suggesting that they are optional. However, this would not suggest to one of ordinary skill in the art that a composition formed in the absence of such an "optional" component will provide adequate overall performance under any given circumstances. It clearly does not suggest that the absence of such a component will lead to any benefit. Therefore, the fact that a component that is conventionally used in a composition is described in a patent disclosure as being optional would not, in itself, be sufficient to provide one of ordinary skill in the art with the motivation to formulate such a composition in the absence of that component.

One of ordinary skill in the art would be aware of the fact that crankcase lubricants formulated for car and truck engines conventionally contain ashless dispersant. The same sentence that states that the dispersant "may" be present further advises that dispersant is "preferably admixed at from 5 to 10 mass %", which would lead one to expect that, given a choice, the dispersant should be added to provide adequate or improved overall lubricant performance. The mere suggestion that it is possible to form a dispersant free composition would motivate one to do so. The exemplified materials of the Fujitsu et al. patent all contain a dispersant. These exemplified materials are all described as containing 8.3 mass % "other additives" (identified as ashless dispersant, pour-point depressant and antifoaming agent). Because pour point depressants and antifoaming agents are conventional added in only relatively small amounts, one of ordinary skill in the art would understand that the exemplified materials contain dispersant in an amount in excess of 5 mass % (within the "preferred" range noted in the Fujitsu et al. patent). Therefore, Appellants submit that, in view of the overall disclosure of the patent, it is disingenuous to suggest that the Fujitsu et al. patent would actually provide one of ordinary skill in the art with the motivation to not only to formulate a dispersant-free lubricant for the crankcase of an internal combustion engine, particularly a car or truck engine, but to do so with an expectation that the lack of dispersant will lead to some improvement in lubricant performance.

AROMATIC CARBOXYLATES AS THE SOLE OVERBASED METAL DETERGENT(S)

The Fujitsu et al. patent in no way suggests that the selection of salicylate detergent provides any relative improvement in piston cleanliness performance. The only benefit of salicylate detergents disclosed by the Fujitsu et al. patent is an antiwear benefit that allows for a

reduction in the required amount of ZDDP. The only benefit of using a reduced amount of ZDDP discussed in the Fujitsu et al. patent is that a reduced amount of ZDDP reduces the amount of phosphorus introduced into the lubricant. The only known detriment of lubricating oil phosphorus content is the adverse effect phosphorus has on the catalysts commonly used in certain antipollution devices (catalytic converters) used to treat engine exhaust. Thus, in types of engines that are not conventionally equipped with catalytic converters, the lubricating oil compositions of the Fujitsu et al. patent would not be expected to provide any benefit. Trunk piston engines are not conventionally provided with catalytic converters. Thus, one of ordinary skill in the art, when formulating a TPEO, would not be led to select a salicylate detergent over, for example, phenate and/or sulfonate detergents.

Further, while the Fujitsu et al. patent requires the presence of a salicyate detergent, said patent does not teach or suggest that the formulated oil must not contain other detergents. The benefit of using a salicylate detergent described in the Fujitsu et al. patent is the antiwear properties of such detergents. If a given amount of a salicylate detergent provides the required degree of antiwear benefit that allows for the use of a reduced amount of ZDDP, and one desired to further increase the TBN of the formulation (to, for example, 25) nothing in the Fujitsu et al. patent would deter one from using another type of detergent in combination with the required salicylate. For example, in Example 1 of the Fujitsu et al. patent, 5.2 wt. % of the salicylate detergent, used in combination with 0.5 wt. % of ZDDP, provides acceptable wear performance. Nothing set forth in the disclosure of the Fujitsu et al. patent would suggest that adding another 5 wt. % of a sulfonate detergent, in order to raise the overall TBN of the composition, for example, will have a detrimental effect on antiwear performance. Therefore, the Fujitsu et al. patent fails to fairly suggest that formulating a lubricating oil composition with no overbased metal detergent other than overbased metal salicylate detergent will provide any advantage.

The Fujitsu et al. patent is not directed to lubricating oil compositions for trunk piston marine engines and the disclosure thereof would not be considered relevant to TPEOs by those of ordinary skill in the art. If considered, the Fujitsu et al. patent would fail to lead one of ordinary skill in the art to formulate a lubricating oil composition having a TBN of 25 or more, would fail to suggest that the selection of a salicylate detergent would provide any advantage in a lubricating oil composition formulated for trunk piston engines not equipped with catalytic converters, would fail to suggest an advantage of using no detergent other than a salicylate in the lubricating oil composition, and would fail to lead one of ordinary skill to formulate a dispersant-free

composition. Therefore, the Fujitsu et al. patent clearly fails to render obvious the compositions claimed in claims 1 through 8 and 11 through 16. Claims 11 and 17 expressly require the addition of a dispersant-free lubricating oil composition into the crankcase of a four-stroke diesel engine, and are still further distinguishable over the disclosure of the Fujitsu et al. patent. Again, there is nothing in the disclosure of the Fujitsu et al. patent that would lead one of ordinary skill in the art to expect that a dispersant-free formulation could even operate in such an environment, much less provide a performance improvement over conventional dispersant-containing formulations. Therefore, Appellants submit that the Fujitsu et al. patent fails to render obvious any of the pending claims.

SUMMARY

For the foregoing reasons, Appellants submit that neither the Clarke patent nor the Fujitsu et al. patent render obvious claims 1 through 8 and 10 through 17. Accordingly, Appellants request that the Examiner's decision to finally reject the claims of this application under Section 103(a) be reversed, and that the appealed claims be deemed allowable.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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SERIAL NO.:	09/846,483		Examiner: E. McAvoy
FILED:	May 1, 2001)	Art Unit: 1764
TITLED:	LUBRICATING OIL COMPOSITIONS)	
			Atty. Docket No. 2000M005

Assistant Commissioner for Patents Washington, DC 20231

APPENDIX TO BRIEF ON APPEAL

Sir:

The claims on appeal are as follows:

- 1. A trunk piston marine engine lubricating oil composition for a medium speed compression-ignited (diesel) marine engine wherein the composition is dispersant-free and has a Total Base Number (TBN) of 25 or greater, and comprises:
- (A) an oil of lubricating viscosity, in a major amount, and added thereto:
- (B) an oil-soluble overbased metal detergent additive, as the sole overbased metal detergent, consisting of one or more aromatic carboxylates, in a minor amount, and
- (C) an antiwear additive, in a minor amount.
- 2. A trunk piston marine engine lubricating oil composition for a medium speed compression-ignited (diesel) marine engine wherein the composition is dispersant-free and has a Total Base Number (TBN) of 25 or greater, and comprises:
- (A) an oil of lubricating viscosity, in a major amount, and added thereto:
- (B) an oil-soluble overbased metal detergent additive consisting of, as the sole overbased metal detergent, one or more hydrocarbyl-substituted salicylates, in a minor amount, and
- (C) an antiwear additive comprising a dihydrocarbyl dithiophophate metal salt, in a minor amount.

. . .

The composition as claimed in claim 1, having a TBN in the range of 25 to 100. 4. The composition as claimed in claim 1, wherein component (B) is present in the composition in an 5. amount in the range of 0.5 to 30 mass %. The composition as claimed in claim 1, wherein the one or more overbased metal detergent has or 6. have a TBN in the range of 60 to 600. The composition as claimed in claim 1, wherein the one or more overbased metal detergent is or are 7. calcium salicylates. The composition as claimed in claim 1, wherein the antiwear additive is a zinc salt. 8. A method of lubricating a medium speed compression-ignited marine engine, which method 10. comprises supplying to the engine the truck piston marine engine oil lubricating composition as claimed in claim 1. The composition as claimed in claim 2, further comprising a fuel oil with a residual fuel content, in a 11. minor amount. The composition as claimed in claim 2, having a TBN in the range of 25 to 100. 12. The composition as claimed in claim 2, wherein component (B) is present in the composition in an 13. amount in the range of 0.5 to 30 mass %. The composition as claimed in claim 2, wherein the one or more overbased metal detergent has or 14. have a TBN in the range of 60 to 600. The composition as claimed in claim 2, wherein the one or more overbased metal detergent is or are 15. calcium salicylates. The composition as claimed in claim 2, wherein the antiwear additive is a zinc salt. 16.

17. A method of lubricating a medium speed compression-ignited marine engine, which method comprises supplying to the engine the truck piston marine engine oil lubricating composition as claimed in claim 2.